Hobbies WEEKLY

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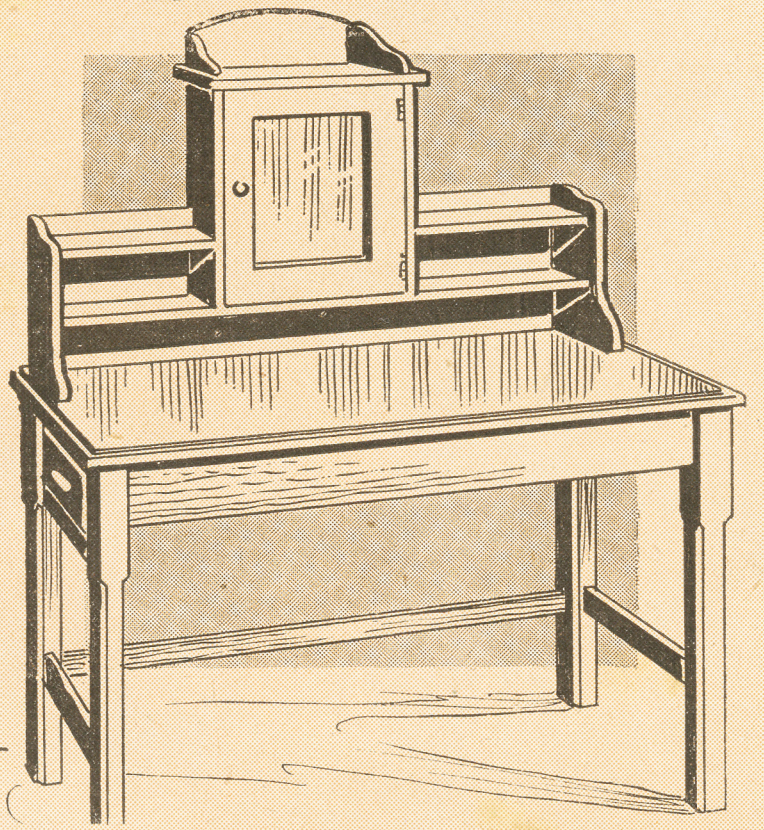
WRITING TABLE AND CABINET

HERE is a useful piece of furniture which the handyman with a little knowledge and a few carpentry tools should be able to make in his spare time. Such an article as this would be most useful to the student, as he or she can have all books and papers ready at hand. The table contains two drawers which pull out from the ends so it is not necessary to move from the table when desiring access to the drawers.

The construction of the table is simplified by having plain square legs, which may be bought ready planed, and, perhaps, grooved at the top for the ends of the rails. Or the grooves may be marked off in pencil carefully and cut in with tenon saw and chisel.



The working diagram, Fig. 1, gives a front view of the table, the dimensions of the rails and the spacing of the shelves. Fig. 2 gives a side view of the table with its connecting rails between the legs and the drawer. Each pair of legs is connected at the top by back and front rails measuring 1ft. 11ins. long by 4ins wide, by ⅜in. thick.

If the table is to be made longer, which it may well be, then these rails could be, perhaps, 2ft. 3ins. or so long, more the proportion that is of the table shown in the sketch of the finished article. The rails are glued into the slots made for them.

Leg Framework

Fig. 3 clearly shows the construction of legs and rails. Each pair of legs is connected by end rails, the narrow top ones being 12ins. by ¾in. by ⅜in. Then 3ins. below this is glued a wider rail 12ins. long by 1¾ins. by ⅜in. Between these two rails comes the drawer front. The lower rails are 12½ins. long by 1in. by ½in., while the back rail corresponding with them are 2ft. long and is similar in width and thickness.

The length given for these last three rails include the tenons which should be previously marked on the legs 7ins. up from the floor and cut in with a chisel ⅜in. deep. Runners ¾in. wide and ⅜in. or ½in. thick are glued to the lower edges of the back and front rails, see Fig. 4, and extend the whole length.

On the top of these runners, and glued in the angles between them and the side rails, are the guides. These consist of squared stuff, the front edges being flush with the inside edge of the legs.

The table top consists of four rails mitred and glued together with a stiffening rail across the middle halved to the two longer rails. The two long rails measure 2ft. 3ins. by 2½ins. by ½in., while the two end rails measure 1ft. 4ins.

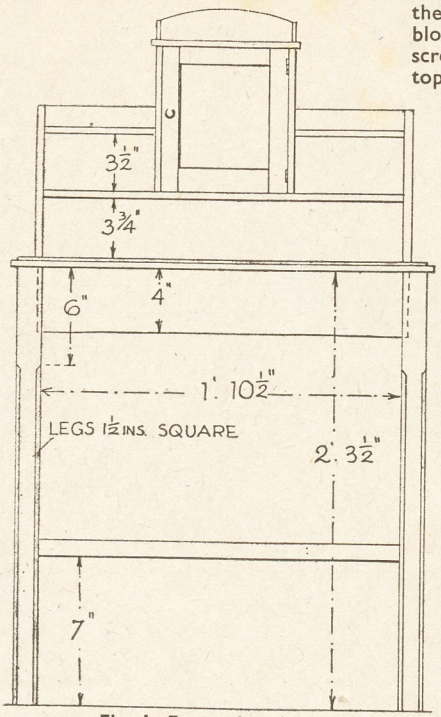


Fig. 1—Front elevation

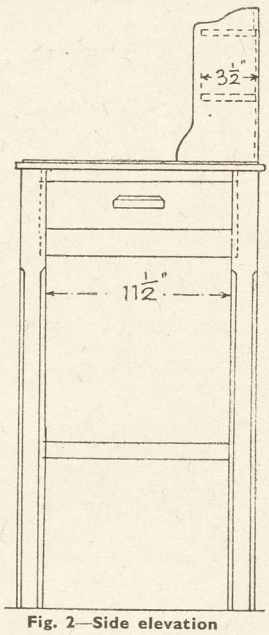


Fig. 2—Side elevation

by 2½ins. by ½in. The ends are cut to a 45 degree mitre and glued up, the stiffening angle blocks being glued in to give additional strength. The cross mid rail measures 1ft. 2ins. long by 2½ins. wide by ½in. thick, and sinkings will be cut for the ends of this rail in the long rails ¼in. deep. The ends of the cross rail will also be cut or halved to fit the recesses in the side rails, the whole top surface of the completed frame thus being perfectly flat and flush throughout.

Table Top

The top of the table consists of an overlay of 5/16in. or ¼in. plywood measuring 2ft. 1½ins. long by 1ft. 2½ins. wide. A small quarter-round beading may be glued and mitred and pinned round the edges of the plywood to make a neat finish. Beneath the centre cross rail must be fixed a ¾in. fillet to form a stop to the back of the drawers.

The simplest way of making the drawers is shown in Fig. 5. The front has two pieces 11½ins. by 3ins. wide and ⅜in. thick, backed up with pieces of commoner wood, measuring 10½ins. by 2⅞ins. wide by ⅜in. thick. To the latter pieces the sides of the drawer will be nailed, these measuring 11ins. long by 2⅞ins. wide by ⅜in. thick. A ply-wood bottom 11¼ins. long by 11¼ins. wide is nailed to the three.

The front of the drawers should, of course, be of the same kind of wood as the table. Handles may be formed of blocks of wood shaped and glued and screwed to the drawer from inside. The top shelves and the cabinet (see detail in Fig. 6) have two shaped ends cut from wood 10ins. long by 5½ins. wide by ⅜in. This size allows for waste after cutting round to the outline.

Set out the shape from Fig. 2 and cut in the usual way with the fretsaw and then clean up the edges. Set out the spacing of the shelves as Fig. 1, and bore holes in the ends ready for screwing up. The main shelf is 1ft. 10½ins. long by 3½ins. wide by ⅜in. thick. This is screwed to the ends, a space of 5/16in. being allowed along the back edge for the fixing of the plywood backing, see Fig. 2.

The sides of the cabinet are 9ins. long by 3½ins. wide by ⅜in. thick, and each is screwed to the long shelf at a distance of 6¾ins. from the ends. The two shorter shelves are 7ins. long by 3½ins. wide and are fixed to the sides of the cabinet and the extreme ends at a vertical distance of 3½ins. from the long main shelf. Short back rails of ⅜in. stuff are fitted and fixed between the sides of the cabinet and the main ends.

The top of the cabinet measures 9½ins. by 4ins. by ⅜in. and three of its edges should be slightly rounded off. It will be screwed to the sides of the cabinet, small pieces of angle fillet being glued along inside to give additional fixing. A plywood back will be fitted to the cabinet, small fillets being glued up the angles inside to make a secure fixing.

Backing and Door

The backing to the shelves should measure about 1ft. 10½ins. by 7¾ins. A piece will be cut away from the middle of this backing board to allow for the space occupied by the cabinet. In Fig. 8 is shown the shaped back rail and two side rails which make up a pediment to the cabinet.

The three pieces mentioned may be of ¼in. or ⅜in. wood shaped up nicely with the fretsaw with the edges cleaned with coarse and fine glasspaper. The proportions of these rails can be got from the main dimension of the back given in Fig. 7.

The door of the cabinet is of simple construction, a piece of 5/16in. plywood being first cut to the exact size of the opening in which it is to fit. Upon this plywood four ¼in. rails are glued and screwed, being butted together, as shown in Fig. 1. The two side upright rails and the top cross rail are 1¼ins. wide, while the lower cross rail is 1½ins. wide. Glue the rails securely to the plywood and then run in a few countersunk screws from the back of the door to bind all well together.

Cheap wood may be used to make up this useful table. Take care in cleaning not to spoil the angles of the wood, such as the chamfers on the legs. These are, of course, optional but necessary if the finished appearance requires to be lightened. All surfaces may be stained light oak or walnut and then finished with french polish or varnish carefully and evenly brushed on.

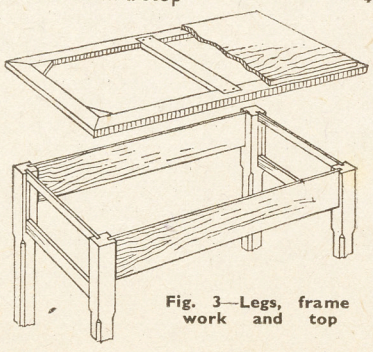


Fig. 3—Legs, frame work and top

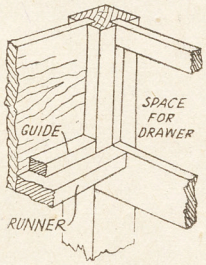


Fig. 4—Drawer detail

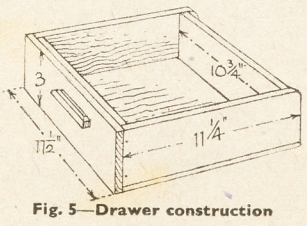


Fig. 5—Drawer construction

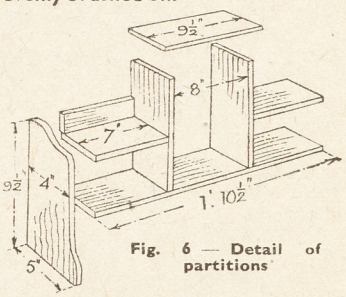


Fig. 6 — Detail of partitions

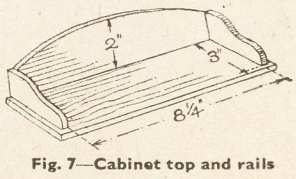


Fig. 7—Cabinet top and rails

Full size patterns on page 301 for this miniature model

R.A.F. CRASH TENDER

HERE is an interesting little vehicle and one quite simple to make once you have acquired the habit of making the chassis framework as explained in previous articles in this series. The shape of cab and bonnet can be altered to your own ideas as the vehicles were mostly built on a well-known firm's chassis and the structure completed on the Royal Air Force Station to suit the type of aircraft using that particular 'drome. Patterns of the parts are shown full size on page 301.

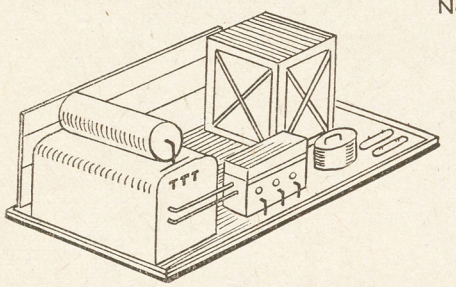
The Chassis

Make the main chassis first. Thin stripwood about $\frac{1}{8}$in. square will do in two lengths 4$\frac{1}{2}$in. with the spacers between $\frac{3}{4}$in. The front part, 1$\frac{1}{4}$in. deep, is covered by the floor panel in No. 3 and, therefore, you do not require bearers. The remaining part is covered with a flat platform and this needs cross-bearers (sketch 1), 1$\frac{1}{2}$in. wide, to come right to the edge. All this part can now be assembled, with a $\frac{1}{8}$in. square beading all round the flat platform

All sections of the cab must now be cut out and we suggest $\frac{1}{16}$in. wood for this. Join together with a strong adhesive or balsa cement.

Cabin

In drawing No. 2 is shown the rear of cabin measuring 1$\frac{1}{4}$in. square with a small window. Pattern No. 3 shows the floor, also 1$\frac{1}{4}$in. square, with cut-outs for the wheels. The wheels suggested are those bought at model aircraft shops, with about $\frac{5}{8}$in. diameter. Leave sufficient clearance, and put in a seat



The equipment behind the cab

based on the floor and to hold up the back panel. This should be $\frac{1}{4}$in. square.

In No. 4 sketch is shown the two sides showing the wide cut-away window and the clearance for wheels. Size again is 1$\frac{1}{4}$in. square, with a slope back of $\frac{1}{8}$in. from a distance $\frac{3}{4}$in. from base. This means you can follow on with the base of the front, which is 1$\frac{1}{4}$in. by $\frac{3}{4}$in.

The driving-screen window (No. 5) is cut and can be made of cardboard if you wish. This mica can be placed in the frame and it can be edged with silver paper to give a better impression. To strengthen all these sections it is a good plan to strengthen with some $\frac{1}{8}$in. square wood on the inside round the joins. This prevents them caving in when handled.

The roof is made from $\frac{1}{4}$in. soft wood and should be made to fit right inside the two sides, back and the front (No. 6). Add to this fitment by strengthening with tiny pins. Force in with pliers and then snip off the tops. You will then be able to glasspaper off to a nice round finish and blend the shaping into the assembled parts.

This type of cab is a little squarish but the art of taking off the corners is simple if you use garnet paper and then fine glasspaper. Few modern vehicles have ugly straight corners these days. Do not rub too deep and so take too much away because you will cause an unsightly gap.

Vehicle Details

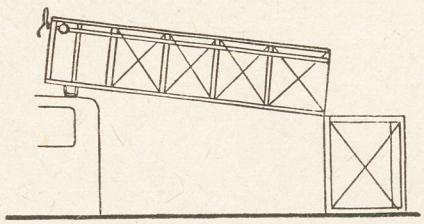
Make sure this part of the vehicle is satisfactory before starting on the equipment part. Note the buffer board from $\frac{1}{8}$in. wood and rounded. The bonnet is shown but you can design this to suit your own taste. It should be a simple design as shown in the finished cab drawing (No. 7).

Mudguards are shown here and thin tin measuring $\frac{3}{16}$in. wide, is the best for this. This allows a realistic rim showing, and this may be further rounded off to the side of the body with plastic wood. Or it can be done with balsa cement. Lamps may be made from pin-heads, door handles from bent pins.

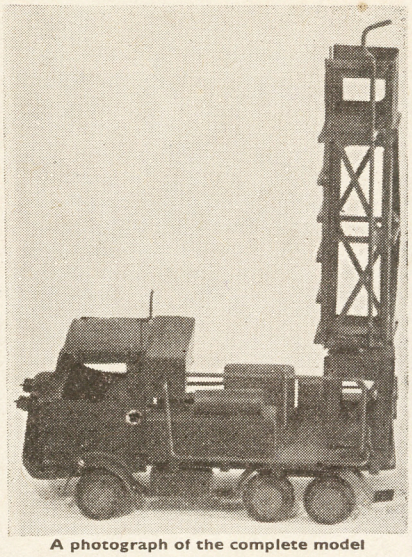
Tender Equipment

Now for the equipment on the platform. One large foam tank is situated behind the cab. This is 1$\frac{1}{8}$in. by $\frac{3}{4}$in. by $\frac{7}{8}$in. high, with well rounded top (No. 8). Above this is another container of compound, from $\frac{1}{2}$in. dowel, 1in. long with rounded ends (No. 9). Fix on with pins. Various other gadgets and containers are shown in the sketches and also in position on the framework.

Note the various tiny taps, wheels and other items which all give a very complicated look to the whole layout. Just a little imagination will help you with these, for they are effective. You will find slide-on paper clips a great help as these are pliant and can represent pipes and hose.



The lattice tower lowered



A photograph of the complete model

The Tower

Now we come to the tower. This is 1in. by 1in. square and the base is fitted to the platform. Make it of $\frac{1}{8}$in. square wood with cross struts as shown. It is a simple plan to make the whole shape in thin card. Cut this all out and then fit on your pieces of wood. If you have never done this before, then it is something worth knowing and saves endless trouble and damage later.

The main part of the tower is the same as the base but 3$\frac{1}{2}$in. high and folds down when not in use. Note to make the platform for the operator $\frac{3}{4}$in. from top. Fix to base with thin card or passe-partout; fit in the hose nozzle and run the pipe up the side.

Wheels, petrol-tanks, etc., can all be added when this structure is completed. Mostly these vehicles were brown or olive green with a round bright yellow circle on the cab roof. Any vehicles of this series which would normally operate on the flying grounds would have this distinctive marking.

Frame Decoration

WHEN you want to decorate or make a picture frame, get a few corks and cut them about $\frac{1}{4}$in. thick. Then cut these in half and stick them on the frame. They make quite a novel and attractive piece of work.

There is much to interest if you make and stock a

COLD-WATER AQUARIUM

THERE is much interest in starting a small cold-water aquarium as an indoor hobby. First—the receptacle. Do not start with the once-popular goldfish bowl—it is not suitable in more ways than one. Instead, obtain a square or oblong tank with a slate back and glass front and sides. Or you may get a glass aquarium with angle steel joints or similar. Prices vary according to size. You may obtain a tank 18ins. by 10ins. by 10ins. for about £2—a somewhat larger one 24ins. by 10ins. by 10ins. for £2 10s. 0d.

In any case, a good size for a beginner to start with is one which holds two gallons of water. Anything smaller is likely to become overcrowded, and that is unwise. Allow at least 6 cubic inches for each fish. It is better to understock rather than overstock your tank, so be satisfied with just a few fish.

Cover from Dust

Put a layer of clean washed sand at the bottom of the tank. Cover the top of the receptacle to keep dust from settling on the surface of the water. A sheet of glass will serve, propped up on pieces of wood to allow free passage of air. Place the tank where it will get light but no sun.

A cold-water tank needs no special aerating appliances. Aerate the water daily by ladling out a jugful of water and pouring it back from a height. You will also need a few water-plants to assist aeration.

Such plants as Ancharis weed, as found in many ponds, is useful, but it grows quickly and must be kept in check. It is a good producer of oxygen; sprigs pulled off the plant will root easily. Other plants recommended include Vallisneria Spiralis and Water Milfoil—this is also to be found in ponds—recognised by its hairlike leaves arranged in whorls of four.

Plants and Water

Collect the plants first and place in the layer of sand 2ins. deep at the bottom of tank. Arrange them in rows a few inches apart towards the back of tank. Next your supply of water, which can be half rain water and half tap water. Fill the tank and leave it for a few days before putting in your fish. In no case should specimens be introduced into the water until it has stood for some 48 hours.

When adding or changing water try to ensure that the fresh water is as near the same temperature and from the same source as that already in the tank. Never run tap water directly into an aquarium; allow it to stand for a time first.

If you have the right plants these, and the continual movement in the water set up by the fish swimming around, will be sufficient to maintain aeration. If, however, the water in time becomes foul, it should be changed.

Water plants, by the way, you can obtain for yourself from the nearest pond. But if unable to do this, you can get them from most of the dealers supplying aquariums and accessories.

Suitable Fish

Fish for the cold-water tank can be obtained from rivers and canals, or from the many dealers in Aquaria. Such species as minnows, tench, common carp, roach, etc., are recommended, to begin with. Sticklebacks are interesting in an aquarium, but, unfortunately, cannot be placed with minnows, as they quickly injure them, so if keeping sticklebacks have a separate tank for them; they are charming little fishes, worth having. You will, perhaps, also be able to get a few water snails, to act as scavengers in the tank.

Fish foods can be obtained from the dealers. Specimens over 1in. long may be given tiny earth worms from the garden, or if the worms are fairly big you can snip them in small pieces with a pair of scissors. Some consider this to be cruel, so instead, get some offal such as liver or kidney, and cut into small bits resembling worms. However, the aquarium shop will supply you with suitable feeding stuffs if you are anywhere near one.

When you intend to stock your aquarium with local fish—this is, fish you catch yourself from a neighbouring pond or canal, it is a good thing to also get your plants for the tank from the same water. The fish thrive better when beside those plants they have been used to since birth.

Keep the tank clean. Do not allow uneaten food to collect on the bottom and there decay. Remove it. If you find your fish congregating near the surface of the water change it. Remember, do not overstock your tank, because it is a fault easily acquired by the beginner.

Select Fish

Select the fish carefully. Small specimens, from 2ins. to 2½ins. long, thrive best in ordinary aquariums. Select only those which are apparently in perfect condition, with no scales missing, and no split fins, or with suspicion of fungus growths about the mouth or fins.

You will find a cold-water aquarium much easier to manage than a tropical tank. It is much cheaper to maintain, for fish can be easily replaced, when necessary, if you live near a pond, lake or canal. The cold-water tank is simple, the fish are hardy varieties, and do not make any special calls upon you in maintenance.

To Mark and Make a Lampshade

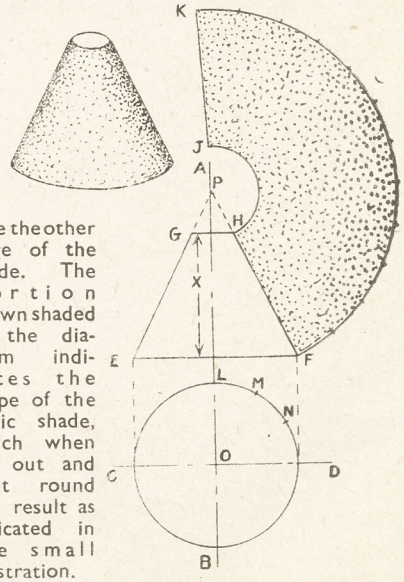
MANY craft workers seem to find it difficult to construct a conical lamp shade, but the work is really quite simple if done in the following manner. Of course, the top and bottom diameter must first be decided upon, also the length of the shade. The parchment is secured on a full size drawing board, or failing this a good flat table top, or even a sheet of three-ply would do.

First lightly draw the centre lines A B, and C D, in pencil, as indicated in the accompanying illustration. With O for centre, scribe the circle which will be the same as the shade base including, of course, a small amount for overlap to provide for lacing.

Draw the diameter of the base as indicated at E F, measure the distance X, which will be the length of the shade. Then draw the diameter of the shade top, indicated at G H, and complete the cone P E F, by joining the top and bottom diameters as clearly shown.

The side of the cone H F, is actually one edge of the conical lamp shade. Now, with P as centre, scribe an arc H J, and F K. By means of the 60 degree setsquare, mark off the circumference of the base into twelve equal parts, as indicated by O L, O M, O N. Set the dividers to L M, or M N, and step off twelve equal spaces round the arc F K, as clearly indicated.

From point K, draw the line K J, from point P, to point K, which will give the other edge of the shade. The portion shown shaded in the diagram indicates the shape of the conic shade, which when cut out and bent round will result as indicated in the small illustration.



A useful piece of domestic apparatus is this

HOME SPRING BALANCE

THE spring-balance as shown in Fig. 1 is an extremely useful piece of domestic apparatus which can be quite easily constructed at very small cost. The design is novel and pleasing; there is nothing to go out of order, no loose weights to become mislaid and it is always ready for instant use.

A glance at the illustration, Fig. 1, clearly indicates its working principle. The lower tube (A) contains a compression spring (B). The upper tube (C) is an easy sliding fit in the lower tube and compresses the spring in direct relation to the weight placed in the scale-pan (D). A calibrated scale (E) is marked on the upper tube, which indicates the correct weighings.

The Size of Spring

The dimensions given are, of course, capable of considerable modification if required, and are governed by the size and compressability of the spring used. A suggested size of spring to use is of 7lbs. compression with a fair amount of travel before the coils close. Such a spring would probably have a 2in. diameter with an overall length of 5ins., reducing to 1½ins. when fully compressed. This would give a free movement of 3½ins., which would give reasonably accurate readings on the weight-scale.

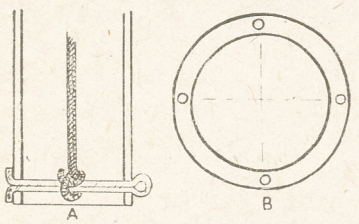


Fig. 2—The securing cord (A) and (B) pattern of collar for base

Assuming that the reader has obtained a spring of the above dimensions, the lower tube which is of either brass or copper, must be 2ins. in internal diameter by 7ins. length. The inside must be nicely polished smooth and a very light smear of oil applied. The upper tube is of similar metal and must be 2ins. external diameter by 8ins. length. Two end-pieces, Fig. 1 (F), are soldered into place and the scale-pan carrier secured into position by a long bolt (G) which passes down the length of the tube and is bolted through and on the end-pieces.

Metal Pan Holder

The scale-pan carrier (H) is constructed of strong metal, preferably brass, in the shape of an 'X' and the securing bolt is passed through the middle intersection. The ends are shaped to hold the scale-pan securely into position as shown in the illustration. The scale-pan can be a fairly deep enamel plate or a shallow round cake tin, whichever is available or preferred.

Near the bottom of the larger tube is drilled two small holes and a split-pin passed through and secured by opening and turning the ends over—Fig. 2 (A). A thin cord or small chain is then fastened under the bolt (G), the spring inserted in tube (A) then the smaller tube (C) inserted inside the larger tube and pushed down until the spring is slightly compressed.

The Stand

Holding the assembly in this position, the cord or chain is fastened to the middle of the split-pin. When the upper tube is released, the cord or chain will be under slight tension and will hold the assembly securely in position, thus preventing any displacement of the upper tube.

The stand should be made from a fairly substantial piece of wood. A hole is drilled nearly through of the same external diameter as that of the lower tube (I). The tube is then pressed in as far as possible and securely located in position by a collar or ring. The collar is made from brass ¼in. thick to the pattern as shown in Fig. 2 (B). This is slipped over and down the tube and is tightly screwed into the baseboard with four screws, Fig. 1 (J). It is then sweated with solder around the tube, thus making a firm and stable assemble.

Etching the Figure

The scale calibrations are made by placing various weights in the scale-pan and noting the positions of the upper tube in relation to the edge of the lower tube. The scale is then marked where indicated with a scriber or similar tool. A better plan, however, is to etch the calibrations with acid. This is done by marking as previously described, then dismantling the tubes in preparation for the etching.

The ground or stopping for the etching process is prepared by slightly warming the tube and rubbing white beeswax over the required parts. Using the previous markings as a guide, the calibrations are made through the wax film with a scriber, noting that the tool cuts through to the metal in the process.

A small quantity of sulphuric acid is then obtained and is very carefully applied over the markings with a brush, taking care that no acid comes into contact with any other unprotected part of the tube. Only a very cheap brush should be used as it will be quickly destroyed by the acid. It should be emphasised that the greatest care and caution should be exercised in the use of this acid, as its extremely corrosive nature destroys and burns practically anything it comes in contact with.

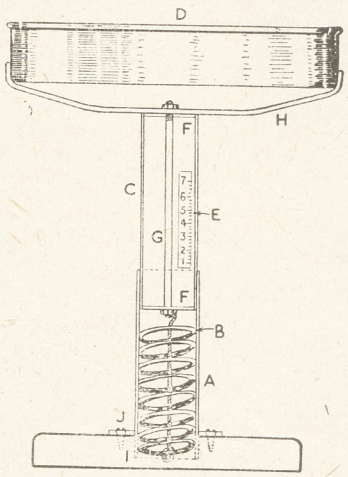


Fig. 1 — Sectional view of parts and construction

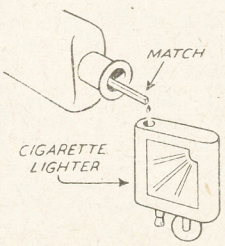
After two or three applications, depending upon the strength of the acid used, the tube should be placed for a few minutes in a strong hot soda-water concentration which neutralises the acid and removes the wax film. The tube is afterwards well washed for a few minutes in running water, then thoroughly dried. Upon inspection, it will be found that the tube has been cleanly and deeply etched where the acid has made contact with the metal.

Painted Numbers

To render the etchings more easily readable, they could be painted with black paint, then any surplus paint on the tube removed with a non-fluffy cloth. It will be found that the paint has filled the etchings, thus making the calibrations clearly visible. Allow a sufficient time for the paint to dry, then re-assemble the components and the scale is ready for use. If desired, the scales may be painted in a bright enamel which will considerably enhance the finished appearance of same.

Lighter Filling

TO prevent spilling when filling a cigarette lighter, hold an unlighted match across the top of the bottle or container. The fluid will flow down the match and drip into the lighter with little loss.



Now is the time to overhaul and undertake
GARDEN TOOL REPAIRS

NOW is the time to overhaul your garden tools and appliances and to carry out any repairs that may be necessary. Do not leave this work until you are ready to use them; there will be a whole host of other jobs to do then and you will not have time to fit them all in. The result is that those necessary repairs will probably be left over until another year.

It is a well known fact that in order to do a job in a satisfactory manner your tools should be in good condition, and not broken and dirty. Garden tools have to stand up to some hard wear, but if care is taken of them they will give satisfactory service over a considerable period.

Handles' Repair

Spade and fork handles often break owing to exposure to the weather, but the trouble can generally be put right quite easily.

The T handle, Fig. 1, generally breaks off at the join with the shaft. It can be made as good as new by first cutting off all rotted or broken parts and then cutting down to a shoulder to fit tightly in the top bar and then to drive in a good wedge. It might be that only a nicely fitted wedge was necessary—cut this from hard wood and do not make the taper too sharp. All wedges should be glued before tapping home to prevent any possibility of them working loose.

Sometimes the top bar is just screwed on to the shaft. This is not at all satisfactory and should be altered to fit as in Fig. 1.

Breakage

Fig. 2 is a common type of handle and often breaks at either (A) or (B). When the break is at (A) and the rest of the wood is intact, cut the top bar out to form a U as in Fig. 3. Fit a piece of dowel or broom handle into this, drill a hole right through and rivet it in place with a wire nail, putting a washer over the end.

If the break is at (B), Fig. 2, you can either fit a new handle or just a new grip. It is not a difficult job to make an entirely new handle and if you have the time it is certainly the most satisfactory way.

Strong Timber

A piece of ash or beech 30ins. long, 4½ins. wide and 1½ins. thick is cut roughly to shape as shown in Fig. 4. Then cut out the grip by drilling the two top corners and sawing out with a keyhole saw. Next round off the shaft and make the end to fit nicely into the spade or fork and then rivet this securely. The top of the handle should be rounded and the whole glasspapered quite smooth.

Provided the shaft is in good sound condition a very serviceable grip can be made from a piece of iron piping, one side of which is shown at Fig. 5. The top part is flattened and then bent to shape while the other end is sawn partly through and also sawn down the remaining length. This part is then opened to fit snugly round the shaft and fixed in position with two or three screws. The top end is drilled and a piece of dowel or broom handle fitted the same as Fig. 3.

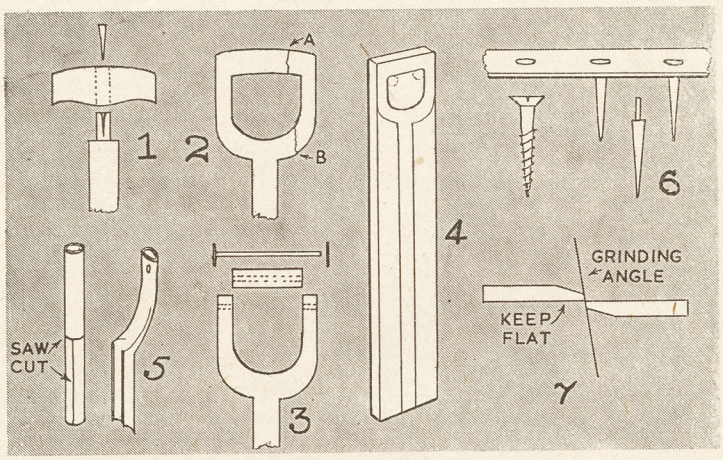
No trouble should be experienced with rake and hoe handles. It is only necessary to cut off any rotted wood and refit the end. A hoe handle usually fits into a ferrule and is wedged in tight, while a rake is made to fit into a length of tapered tube and is held firm by one or more screws.

Fork Prongs

It frequently happens that the prong of a fork works loose or is broken off altogether. It is an easy matter to tighten up a loose one by riveting, so also is the making and fitting of a new one. A really first class prong can be made out of a wood screw as shown at Fig. 6. It is only necessary to file the top down to a shoulder and rivet in place. The screw thread may be filed off, although it does not matter if this is left on.

Garden tools should not be allowed to lose their original polished surface and get rusty and caked with dirt. You will notice a good gardener always cleans the dirt off his tools and rubs them over with an oily rag when he has finished work for the day.

They do the job so much easier if they are kept in good condition besides looking so much more professional. So if you have allowed yours to get rusty it will be well worth the time spent by giving them a good emery papering to make them shiny again. It may seem a long and tedious job, but you will not regret it. Then with an oily rag or some vaseline, give them a good rub over. It is also a good idea to give all woodwork an occasional rub with linseed oil as this will preserve the wood and help to keep the wet from rotting them.



Cutting Tools

Do not forget to include the cutting tools such as shears and pruners in your overhaul. These should be kept clean and bright, and the cutting edges sharpened from time to time.

It is only necessary to grind the edges, and the grinding angle is shown in Fig. 7. The inside surfaces should be kept flat and not ground. It is sufficient just to emery paper these to keep them shiny.

A lot of trouble is often given by the joint working loose due to a faulty nut and bolt. This trouble can generally be cured by fitting a spring washer, but should this not be satisfactory, it will pay to get a new nut and bolt that fits tightly.

When garden tools are out of use for a considerable time they should be well greased, wrapped round with waxed paper or a piece of oily rag and hung up if possible in a dry airy place.

There are several varieties of easy-to-make

WORKSHOP FIRE ALARMS

WHERE woodwork is done and shavings accumulate there is always the risk of fire. This is not a matter that we like to think about too much, but it is one that should not be entirely ignored. It is a duty to take what precautions you can against such an event happening, especially if your workshop is located in a wooden shed. A fire is so easily started and it may be beyond control before you know much about it.

If you make a lot of shavings they should be gathered up and destroyed before they become too unruly. Perhaps you are lucky enough to have electricity in your workshop; then the installation should be checked over by an expert. It is quite easy for sparking to occur at a faulty connection and this could soon cause a fire.

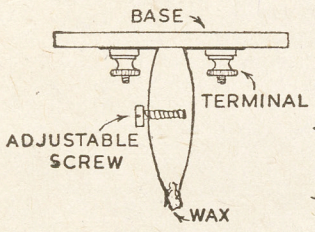


Fig. 1—A simple type

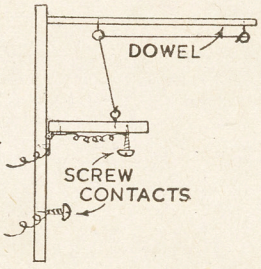


Fig. 2—Lever and cotton

The most satisfactory way to deal with a fire is to catch it as it starts, and the best method of giving you warning is to fit an automatic fire alarm. There are a variety of quite simple devices that are very efficient and may be made and fitted by any handyman. They all operate in the same manner—when a fire starts the heat causes a circuit to close which in turn rings an electric bell.

They can be fixed in places where you think it most likely for a fire to start, and there is no limit to the number that can be used.

The Simplest Type

The simplest type is shown in Fig. 1 and consists of an insulated base on which are mounted two pieces of spring kept apart by a piece of paraffin wax. The application of heat near this will melt the wax and so cause the springs to close, thus completing the circuit and ringing the bell.

The Base

The base can be made of any insulated material such as wood, ebonite or even stout cardboard about 3ins. long by 2ins. wide. Two clips of good springy brass are fastened to the base by the terminals about ¼in. apart. The spring part is 1½ins. long with another ½in. bent at right angles for the fastening, making a total length of 2ins. and with a width of ¼in.

An adjustable screw is fitted about half way along one of the springs for making the actual contact. It could be omitted, but it is possible that when the wax melts a certain amount would run over the contacts and act as an insulator. So it is advisable to put it in and be on the safe side.

Any number of these boards can be made and fitted where you think necessary, but they must all be connected in parallel, as shown in the wiring diagram in Fig. 3. There is one very important point to remember when fitting this type of contact. Do not put where they may get the direct rays from the sun as there may be quite enough heat from this source to melt the wax and set the bell ringing.

The amount of current necessary to work the installation will depend on the length of the wiring. If your workshop is small and the wiring has been kept short then one cycle battery will be sufficient, but should you have a large number of alarms and a lot of wiring, two connected in series should be enough.

For the wiring ordinary bell wire can be used. A fairly powerful bell is best for the job and it should be placed in a position where it is possible to hear it easily wherever you may be.

Another type of alarm, which is equally simple and efficient is shown in Fig. 2. Here we have a lever held up by a piece of thin cotton which, when flames approach it, is burnt through, allowing the lever to fall and make the necessary contact. The longer the cotton is left the more efficient will the gadget be. The only disadvantage with this alarm is that it must be fixed in one position only so that the lever is free to fall easily.

A piece of wood about 4ins. by 2ins. will be large enough to mount the parts on. Near the top is fitted a length of dowel rod with screw eyes to hold the cotton in position. The length can be according to the room you have at your disposal, but should not be too long.

Wood Lever

The lever, made of a fairly heavy wood about 3ins. long, is fixed to the board by a small easily-moving hinge. Contact is obtained by using two brass round head screws, and make sure in the fixing to line them up so that when the lever falls the two screws *do* make perfect contact.

The two wires necessary for the operation of the alarm are fixed to these two contact points, the one on the lever is led off via the hinge so as not to hinder the lever from falling.

For the person who wants a really first-class job the following suggestions will be found helpful. The ideal system is one which automatically puts the fire out almost as soon as it starts. This may sound rather difficult, but such an installation is not beyond the skill of the average handyman.

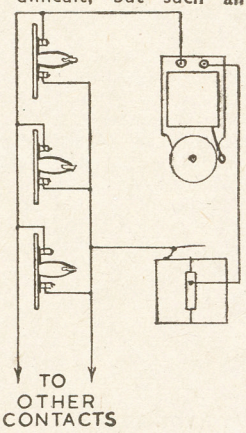


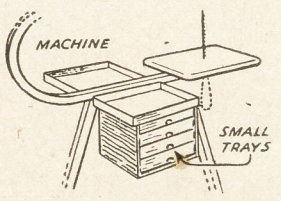
Fig. 3—An extended set

The workshop ceiling is fitted with a series of water pipes which are broken at vital spots by little 'sprinkler' valves. These are no more than short lengths of pipe having a small hole, the end of which is plugged with a piece of paraffin wax.

The heat of a fire melts the wax and the rush of water from the jet puts the fire out. The water could come from the house supply, or a tank on the workshop roof might be sufficient to deal with an outbreak. Quite small pipes can be used as there need not be much pressure. If this system is adopted it would be as well to have an electric alarm in operation as well to give warning if a fire does actually start.

Machine Addition

A BOX about 6ins. by 4ins. by 4ins. is made to hold, say, three ½in. and two 1in. deep drawers, and is made by drilling two holes in machine tray, also top of box, and fastened under either side of tray with two small nuts and bolts. It is handy for holding sawblades, files, fretnails, etc., and can be made out of odd pieces of plywood.



Add novelty and power by attaching

A MODEL CRANE MAGNET

A LOT can be added to the realism of a model crane if it can be made to pick up a load without any fumbling on the part of the operator. That is, if the lifting gear descends on to a package which, without anyone going near it, is raised as the gear once more goes up.

Well, such an action (which is ideal for demonstration purposes) can be obtained by using a simple electro-magnet, as described here. These magnets, as lifting agents, are used on cranes in scrap-iron yards, so you will not be

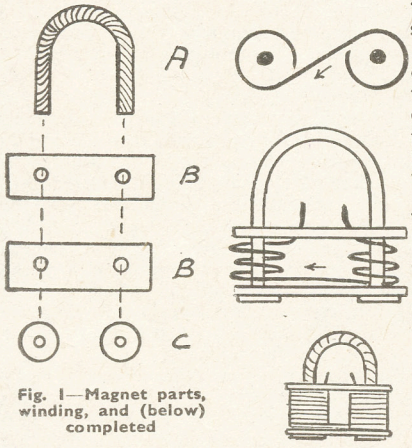


Fig. 1—Magnet parts, winding, and (below) completed

getting so far from real practice in putting one on your own crane.

In the scrap yards the electro magnet (which replaces the hook) is lowered into a pile of iron fragments, the driver switches on the current, the magnet becomes effective and as the crane is reversed, up comes the gear with half a ton of metal sticking to it. The jib swings, down goes the load, the driver switches off and the pile is released but in a new position. Much time is saved with this procedure as compared with the days when every bar almost would have to have been chained and hooked. Also one man can work the whole proceedings.

Magnetic Attraction

An electro magnet, in its performance, is just like a very strong ordinary magnet. The electro magnet, however, only exerts attraction when a current is being passed through its make-up. Other types of magnets have an attractive force inside themselves which is there all the time. Thus, while 'permanent' and electro magnets in effect are the same, the electro magnet scores from the engineering point of view as the attraction can be entirely stopped or brought into action as the situation demands. Hence its use in crane work.

The principle of the electro magnet is simple. There is a soft iron core around which is wrapped a length of ordinary electric wire. That is all. A current is sent through the wire and the soft metal core suddenly becomes a magnet, the strength of which depends on the amount of current. Switch off and it is once more a plain piece of iron.

Making the Magnet

With these details well in mind let us see how we can fit our crane with one of these handy lifters. The crane to which it is attached must not be too small, as the whole magnet will measure about 1¾ins. by 1¾ins., and if the crane is too small this will look out of proportion.

The core (A, Fig. 1) in our case is made of several strands of soft wire twisted together to make a bundle of about ¼in. diameter. It is 3½ins. long. This length is then bent into a U-shape with about 1in. between the legs, and with a height of 1¾ins.

Now cut two pieces of card as (B). These are 1½ins. long and have holes bored so they will fit on the two prongs of the core. Make the holes smaller than ¼in., so there will have to be a certain amount of forcing to get them on. Cut also two discs as (C) also with holes less than ¼in. in the centres.

Winding

Now fit the first card in position and proceed to wind the magnet. The wire, which is No. 22 S.W.G. D.C.C. double cotton covered, is led in through a hole in the card and given a good number of turns round the one leg of the U, always winding *inwards*. Start at the top of the leg close under the card and spiral down to about a ¼in. from the end and then spiral up again over the first layer.

After doing the first winding it is good to put on the second card, as this keeps the wire tight, but takes more time as the wire has to be threaded each time. Four layers of wire should be put on and then without breaking, carry through another hole in the top card and proceed to wind the second leg, the turns again always coming inward. The important point is that there must be the same number of turns and layers on each leg.

To make the job firm and keep the wire in one solid mass, each layer of windings should be given a coat of shellac varnish before the next layer is put on. Also to give a finished appearance and to help further still in keeping the coils solid, wrap strongly gummed paper round each completed leg. A touch of glue on the lower and upper cards where they meet the coils also helps further to keep everything tight. Finally put on the two washers (C) gluing to card above.

When all is dry, file the ends of the core (A) flush with the discs (C). Wrap also the top curve of the core with narrow strips of gum paper.

On Test

Make a test now. Attach the ends of the winding wire to a battery and if all has gone well the U core will at once become a strong magnet, with the power of holding metal items when a current is passed through the winding wire.

Now to fasten the magnet to our crane. Two quite big lengths of that fine rubber-covered wire as found in ordinary flex stripped of its covering are required. These are to act both as lifting cable and leads. A start is made at the drum. Here two bands of tin, as shown in Fig. 2, are wrapped round near the end, being overlapped and held by single pins.

Before driving right home, however, the cables must be attached, one to each, by baring the wire and twisting it round the pin between the band and the wood. The lead to the outer band has to go under the inner one and this is effected by cutting a channel. As flat a surface as

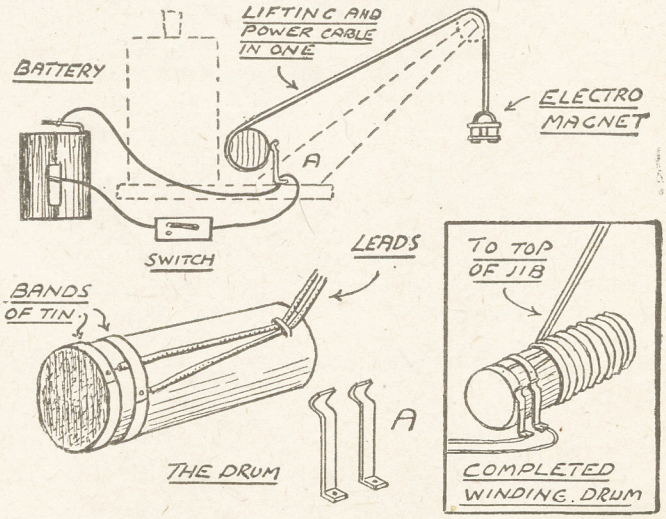
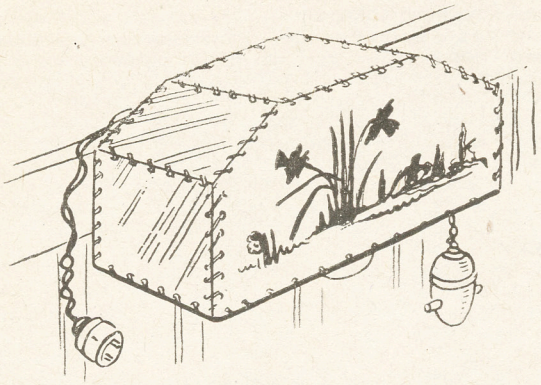


Fig. 2—Working parts and details of the crane

(*Continued foot of page 300*)

A practical article to make for yourself is

A WIRE-FRAME BED LAMP



THIS lamp is very easy, indeed, to make and lends itself well to a number of attractive decorative methods of finishing off. For the frame, any fairly stiff wire is suitable. Stout copper wire of about 14 to 16 S.W.G. can be used, and this is particularly convenient if the joints are to be soldered. However, soldering is by no means essential and any kind of wire available may be used. Thick iron wire can usually be obtained from an ironmonger.

Bending the Pieces

Take a length of the wire and bend it to the shape and dimensions shown (A) in Fig. 1. Straighten the wire to begin with, and make the corners quite sharp, as shown, by using pliers to form the bends. The ends overlap about ½in. at the bottom right-hand corner, and this junction is soldered or bound with thin wire or stout glued thread. Make two of these shapes, one being for the front of the lamp.

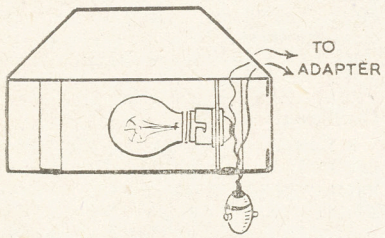


Fig. 2—Bulb mounting and switch

The wire shown at (B) is now bent into shape and fixed in the position illustrated. This wire is not required at the front.

Lampholder and Brackets

The brackets (C) and (D) are cut from stout tin or other metal and the top of each has a hook which will enable the completed lamp to hang on the bed-rail. Strip (C) will need to be about 4½ins. long and ½in. wide. The bottom is bent firmly round the wire (A) and the top passes over wire (B), the hooked part projecting backwards.

Bracket (D) is made in a similar manner, but has a flange and hole, as shown. This flange is bent at right angles so a bulb-holder can be screwed into position. As holders differ slightly in size it is well to make the hole accordingly, so the holder is quite secure when the two milled rims normally holding the shade in position are screwed up tightly on each side of the flange (see Fig. 2).

Completing the Frame

Six wires of the size shown at (E) in Fig. 1 are now made, with projecting ends about ¼in. long. One of these is secured at each bend in the perimeter of the wire (A). This may be done by bending the projections once completely round the wire (A) and closing up tight with pliers. After placing the six wires in position, add the front wire which is similar in shape to (A) and bend the ends of wires (E) round, thus forming the box-shaped frame with sloping sides made clear by the illustration.

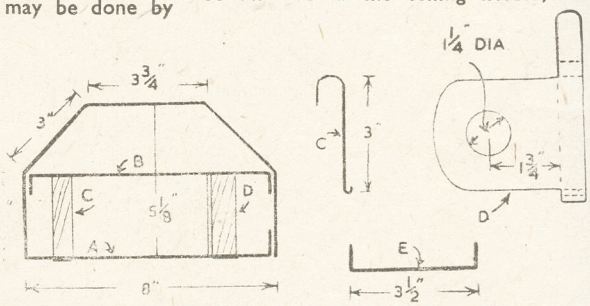


Fig. 1 – Dimensions and shape of parts needed

Many ways of covering the frame will suggest themselves. Suitable tinted or patterned material may be cut and sewn in position, or six pieces of parchment or thin card may be cut and laced on with coloured ribbon passed through holes near the edges of each piece.

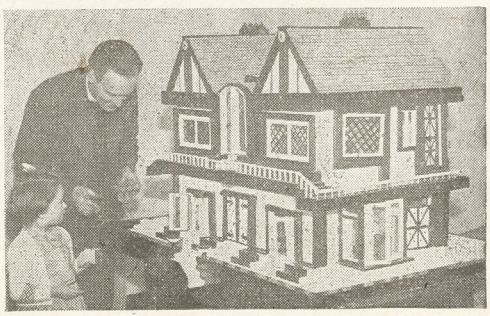
Finishing the Lamp

The front of the lamp should bear some suitable design, and the craftsman who is handy with colours will have a good opportunity here for designing something interesting and attractive. Whatever type of covering is adopted, the material is placed on from the outside so that the wires, etc., are all concealed.

The electrical wiring is very simple and shown in Fig. 2. Twin flexible leads are taken from the lamp, and a small hanging switch is included in one of the leads so that the bulb can be switched off from the bed. The leads from the lamp may be fitted with an adapter which can be inserted in the ceiling holder, or power can be taken from any other point, if more convenient.

The Minister Builds a Home

No wonder the little lady gazes with delight and awe at the Doll's House her father has made! The Rev. J. L. Baillee, of St. Andrew's Church, Holmfield, near Halifax, has spent his spare time in four years building a 'dream house'—a combination of all the homes in which he has lived—for his daughter, Jane, age 4½. The house is a one inch to one foot model, has separate lighting in each room, with the switches cunningly concealed in the chimney pots. Two flights of stairs lead from an old-fashioned hall to a landing balcony. There are three bedrooms, dining-room, drawing-room, kitchen, bathroom and garage. Between kitchen and dining-room is a service hatch, while some of the rooms have sliding doors. Imagine the hours of enjoyment the minister had in planning and building, and now the hours of pleasure Jane is going to have using it. That's something like a hobby—pleasure for all concerned!



This chapter about shrinkage and movement explains

MORE ABOUT TIMBER

IT will, no doubt, have been noticed by readers that most articles of furniture and the timber-made fixtures in the home, such as doors, window frames, and sashes, are all constructed on the principle of the frame. The two main reasons for this are:—

(1). Reduction of shrinkage.

(2). Increased strength.

Suppose for a moment you had a large tree, recently felled, and that from it you obtained a plank of timber the size of a front door, and for this purpose put it to use.

No doubt it could be made very attractive at first, but as the natural shrinkage took place, its width would probably be reduced to such an extent as to render the door useless for its purpose. As timber does not shrink in its length the height of the door would be unaffected.

The fact that timber shrunk only in width as it gave up its natural moisture was learnt in the very early days, and the knowledge has been put to practical use ever since by constructing work where possible in the manner of a frame, as shown in Fig. 1.

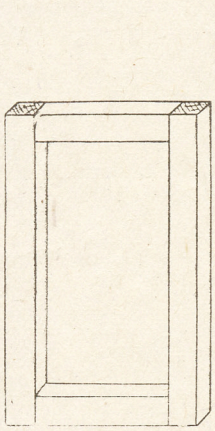
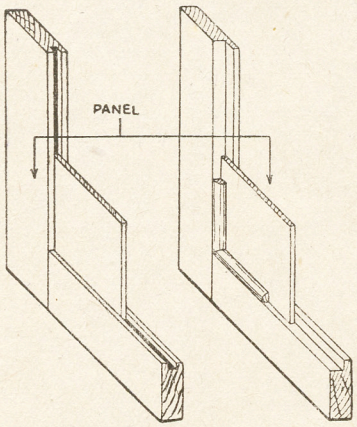


Fig. 1—The frame system



Figs. 2 & 3—Two methods of fixing panels

Shrinkage

Any shrinkage that takes place in the width of the timber is confined to the narrow members with consequent reduction in the total shrinkage possible. In addition, extra strength is obtained by the cross members having their grain running at right angles to the uprights.

The basic need for framing is the same whether the work is large, such as the front door, or part of a sideboard, but, naturally, the smaller the work the smaller the timber used and, therefore, less shrinkage takes place. Wide or narrow, however, there is bound to be movement in timber and provision must be made to reduce its effects to a minimum.

The major solution to timber shrinkage is found in using seasoned or dried-out timber. This is material that has been stacked for lengthy periods and has slowly given up its moisture.

Alternatively, it may have been dried in a modern kiln, a much quicker process which has the advantage of being under control during its drying, also that the timber can be brought down to any degree of dryness. This degree is known as the moisture content. Timber dried out to approx. 14% M/C would be considered dry and is the usual amount for furniture or other high class woodwork intended for indoor use.

If timber with this moisture content were to be made up in an article of furniture, and finally placed in a damp atmosphere, the natural tendency of the wood, would be to absorb moisture until it found its own level with the surrounding atmosphere. Similarly when the air became drier the timber would dry out again.

Temperature also has its effect. A hot day will cause the members contained in a piece of furniture to dry and warp, and during the night when the temperature drops the timber will tend once again to return to normal. This often creates creaking in the process, as a member gets released of its stress, especially where wide timbers have been used.

Allowing for Natural Movement

A good example of provision for movement is seen in the construction of a panelled door or sideboard. Panels are put in a groove all round (Fig. 2), or are put in a rebate (Fig. 3) and 'beaded-in'. Whichever method is adopted the panel is free to move. Whereas had it been fixed at each outer edge any contraction would have resulted in a crack permanently marring the work.

For this reason it is as well to bear in mind that in fixing a moulding round the panel, avoid allowing the fixing nails entering the panel edges.

A drawing or pastry board is another typical example of provision for movement. A well-made board will have cleats screwed on the back with round headed screws engaging in slots instead of holes. It will be seen in Fig. 4 that the centre screw is not allowed to slide. This is to keep the panel central, the movement being equal each side.

The methods of holding down kitchen table tops, shop and bank counters, are very similar, the aim for all is a sound fixing yet allowing for movement. The kitchen table has probably the greatest need for freedom of movement, it being made of a white soft wood, often scrubbed, and frequently near an oven.

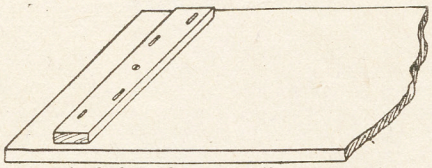


Fig. 4—A slotted truss to allow contraction

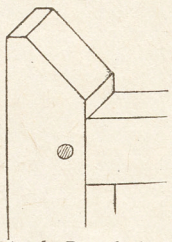


Fig. 6—Dowel pin

The fixing used in all of these articles is the time honoured 'button' in wood or metal. Both types are shown in use in Fig. 5. The wooden type is usually made from hardwood 2¼ins. square and ⅜in. thick with a ¼in. tongue engaging in the rail.

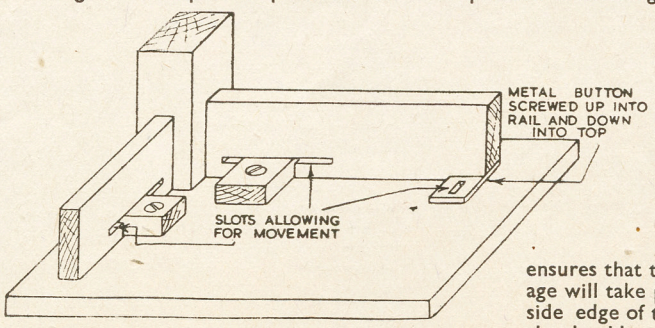


Fig. 5—Underview showing fixing to allow movement

On Dowels

It frequently happens that a dowel is required to give additional strength to a joint, or as sole means of fixing a tenon. Its position is once again governed by the known tendency of timber to shrink. Reference to Fig. 6 will show that the dowel is nearer the shoulder of the tenon. This, apart from extra strength on the pull of the tenon, ensures that the major shrinkage will take place at the outside edge of the work, leaving the shoulder a tight fit.

A worth-while job for the handyman is the way to

RENEW SMALL WINDOWS

MANY home-craftsmen show a profit on the sale of toys made in the course of their hobbies. But money—which will buy new tools and lead to more ambitious and interesting work—can also be made by doing jobs in the houses of neighbours and friends.

For example, although large windows are best left to experienced workers, even the most amateur of hobbyists can make a sturdy job of replacing small pantry windows. And, indeed, in many houses—especially where these little windows face on to someone else's property—they are often overlooked and become rotten through neglect.

By undertaking to renew such a window, experience, as well as profit can be gained. The plan given here calls for no special tools and only a small outlay of cash—an astonishingly small amount, in fact, when compared with the fee which would be charged by a jobbing builder.

Measuring the Job

The first thing to do is to obtain the measurements of the window frame. Using a hammer and old chisel, knock away the cement from around the outside of the old window so the edges of the wood are revealed. Having taken the measurements leave the old window in place until the new one is ready for fitting.

This plan enables you to pre-fabricate the new window as a whole unit, and the wood wedge or wedges and the cement on the inside of the old window will hold it in place until you are ready to make the change.

Wood 2ins. square is ideal for the new frame. It will be strong enough to make a cross-bar unnecessary, and is easy to measure for the simple joints. It can be bought from a joiner or timber merchant, who will usually be willing to cut it to the exact lengths you want. The top and bottom should be the whole width of the window frame and the sides the whole height so that the joints can be made.

A Simple Joint

The simple joint shown in the illustration is quite suitable for this type of rigid, unmoving work. Mortise and tenon joints, though of better appearance, are more difficult and only really necessary when making a moving framework such as a door or in furniture which has to stand uneven stress and where appearance is of the greatest consideration.

On each end and on the same side of each of the four lengths of wood, mark off with pencil and ruler the wood to be cut away. This will be a block 1in. deep and 2ins. square. Use saw and chisel with great care so the frame fits together very evenly. The joints should be glued for a perfect finish, but one or two nails through each joint are sufficient to make the whole perfectly rigid.

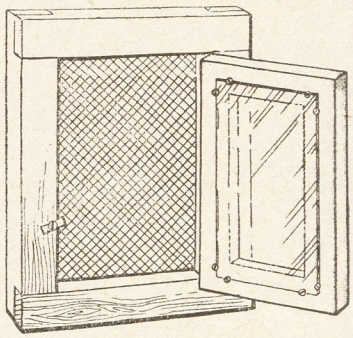
A piece of perforated zinc or small gauge wire mesh is used on the outside to keep out flies. A neat job will be made by fastening it down with a frame of ⅜in. wood bars, but, if these are not available, an efficient and not unsightly finish can be obtained by merely turning under the edges of the zinc or mesh, gently hammering these flat and fastening with large-headed nails or screws at frequent intervals.

The Moving Part

The moving part of the window can most easily be made from a single piece of 1in. thick, well-seasoned wood 4ins. shorter and narrower than the outside measurements of the frame. That is, it is cut to fit snugly inside the frame. All around this wood, measure off 2ins. and, by boring or chiseling a hole and using a fretsaw, cut out the centre marked off.

A sheet of glass 1in. longer and wider than the cut-out portion is then fitted to the outside of this single piece window. It may be sunk in level and made water-tight with putty, but an excellent utility job can be made by merely fixing it with two large-headed screws at each of the four corners. The zinc or mesh will carry off most of the rain, so that an absolutely water-tight job is not essential.

This little window is hinged to the frame, either on the outside of the prefabricated unit, or, preferably countersunk on the inside of the 2in. square frame and the edge of the moving



window. Finally, a simple catch is fitted to hold the moving window shut.

The new window unit is now complete. From around the inside of the old frame, knock away the remaining cement. One or two wedges will be revealed and these should be hammered and levered free. The old frame will then come out easily.

Any old cement remaining on the masonry should be scraped away. The new window unit is then put in position and fixed firmly with a wooden wedge of such a length that it will not stick out beyond the edge of the new frame. This single wedge will, in most cases, be quite sufficient to hold the frame perfectly rigid, but another may be driven in at the worker's discretion.

Suitable Cement

Cement suitable for making the frame a part of the wall can be bought ready mixed in small quantities from most builders' merchants. 'Mastic' is ideal for the outside, but is slow to set indoors, so you should be careful to state your requirements fully. Economy in its use can be made by stuffing any wide gap between wood and masonry with newspaper. This will also make a foundation for the cement.

Although so simple and inexpensive to construct and fit, this finished job, when painted to harmonise with the general colour scheme of its surroundings, should be its own advertisement and bring you more work of a similar kind, if you wish it.

Electric Guitar

I AM making an electric Hawaiian guitar, but the problem I have, concerns the making of the pickup to go under the six strings against the bridge. I have temporarily put a single headphone with the diaphragm off under one string, and it picks up O.K. I would be pleased if you could tell me how to pick up from the six strings. (J.J.—Norton).

AS the magnets of the earpiece are not wide enough to pass under all the six strings, it is necessary to mount the phone under the bridge. To do this, replace the diaphragm, but leave the ebonite cover removed, if it is at all large.

A very low bridge is now cut from any hard wood, with small notches for the strings. This bridge is placed upon the earpiece, and it will be found that the tension of the strings will hold it in place. The bridge should be curved slightly in the centre, so that it does not push the diaphragm down on the magnet poles, and all the strings will then be reproduced.

* * *

Table Heat Stains

I WOULD like to know the best way of removing hot iron stains off a polished table top. (R.A.—Knottingley).

SPREAD a little warm camphorated oil over the marks on the table, and rub well with a pad of clean rags folded up. As the marks disappear, sprinkle the face of the pad with spirit of camphor until it feels slightly damp but not wet. Follow up the rubbing with this, rather lightly at first, then bearing harder as the pad dries. Finally, remove traces of the oil with another pad dampened with brown vinegar.

* * *

Developing Prints

WHEN developing prints in photography, my results dry a light red, where it should be white. Not all my prints are faulty. Please would you tell me what I do wrong. (D.P.—Levenshulme).

IT appears you are not fixing your prints properly. You should, immediately after developing each print, give it a brief rinse in clean water (only a second or two), and then immerse it *completely* (this is important), in an acid fixing bath. The prints should remain in the fixer for at least ten minutes, and should be kept moving and well submerged for the first five minutes at least. Half an hour's washing in running water will complete the job.

An acid fixing bath of the correct strength for prints, may be made by adding 1 oz. of Johnson's Acid Hypo to 15 ozs. (¾-pint) of warm water.

The red stains are due to the developer left in the print, after incomplete fixing and washing, oxidizing on contact with the air.

* * *

Plywood Canoes

I AM designing a canoe, and I was thinking of using plywood as the covering, but I wondered if it would flake or warp in any way, even if it were painted properly. (D.W.—Aldermaston).

PLYWOOD by itself cannot be recommended as the web tends to separate the plys, even when painted. It can, however, be used as a support for canvas or twill covering when the design of the canoe permits, and therein lies its usefulness.

We suggest you coat the plywood with good quality lead coloured paint, then cover it while the paint is still wet, with a strong twill or calico; press down until it adheres all over. When dry, coat with boiled linseed oil to which a little driers has been added, and then when the oil has dried, it takes a few days, paint two coats all over. Don't forget to paint the inside surface of the plywood, too.

* * *

Fire Balloons

I AM most anxious to construct a fire balloon, and have had several attempts without success. Can you supply me with some instructions? (C.M. — Sutton Coldfield).

THE best way to make a fire balloon is to construct the balloon with a series of shaped strips of thin tissue paper. For a balloon about 2ft. diameter, you would require 12 strips 6in. wide in the centre, tapering to nothing (or a pointed end) at one end, and tapering from the middle to the other end which should be about 2in. wide. The strips should be about 3ft. long. Lay all the strips on a flat surface—side by side—then join them together by pasting their edges. Allow to dry, then roll the outside strips over and join them, thus making a ring, then gradually join all the edges by pasting them together.

* * *

Complete the top with a disc of tissue paper. Fix a very light wire ring around the bottom part, which should now be open and about 7in. diameter.

Fix two cross wires (very light) at rightangles to each other to the ring, fix a wad of cotton wool to the centre, soak it in methylated spirit. Hold the balloon up by a cotton loop fixed to the top, light the spirit and after a few seconds when the air has had time to heat up in the balloon, let go—and the balloon should ascend to go a good height.

Coloured tissue paper gives a brighter and more attractive effect than plain white.

* * *

Workshop Warming

WILL you tell me the best method of making my workshop cooler during the hot weather, as it is like a bakehouse in the middle of Africa. It is made of corrugated galvanized sheets, and is very cold in winter. (R.S.M.—Penrhiwceiber).

FUNDAMENTALLY, the only way to keep your workshop cooler in summer and warmer in winter, is to fix an inner lining to all the walls and roof area. For this purpose, use thick building board (about ⅜in. to ½in. thick). Nail this to a wooden framework and arrange it so there is a free air gap of at least 2in. between the inner lining and the outer walls.

Next arrange means to circulate the air in the gap between the walls; for instance, by providing air inlets all around the bottom and using a chimney or pipe about 1¼in. and some 3ft. or 4ft. long to draw the hot air out from the top.

A quick way of reducing the heat is to erect a span roof tent covering over the roof some 6in. or so above it—to provide shade and a free air flow. Spraying the exterior with water also helps keep it cool, but only for short periods.

Crane Magnet—(*Continued from page 296*)

possible has to be given to the bands, so the pins are driven well in and the heads filed fairly flat.

Take the leads along the drum to the further end and fasten with a U-staple, and then wind a good length on to the wood. From here take the cables over the pulley on the jib and attach the magnet by binding them (over the rubber) to the top of the U core with fine wire. This takes the load, the electric connection being effected by baring the separate ends and fastening them to the ends of the magnet winding, one to each, seeing that there is no shorting.

Back at the drum now cut two pieces of strong tin as (A) Fig. 2 (clock spring with the temper taken out of one end would be the best). These must be so fixed that they slide and press against the tin bands, and they may have to be fitted differently on different cranes. From their base two cables are led to a cycle lamp battery, a simple switch being put in on one lead.

By this arrangement the magnet can go up and down with the lifting end of the cable and its power of attraction can be brought into force or cut off at will by the switch.

Finally, of course, the loads to be lifted should either be of metal or contain some metal parts. Thus, model bales could be made, bound with tin bands, etc.

A few pieces of wood and the fretsaw will make

A NOVEL PIPE STAND

THE novel pipe stand indicated in Fig. 1 of the accompanying illustrations is just the thing to make for a present, for the construction is quite simple. The figure to be cut from a sound piece of wood ¼in. thick, is indicated in Fig. 2. First cut the wood to size 6½ins. long by 4ins. wide, and carefully divide one face into ½in. squares, as indicated in Fig. 2.

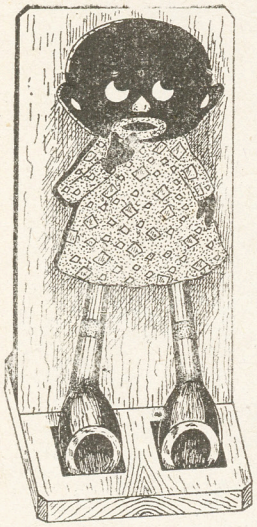


Fig. 1—The holder complete

It is now a simple matter to draw the figure on the wood from the outline given. Take care when marking off and cutting out the three mortise slots, ½in. by ¼in. given in position in Fig. 2. Only the outline of the figure is cut out, since the hands, eyes, nose, mouth, and ears are treated with enamel paint.

The base is indicated in Fig. 3, and a nice piece of wood ½in. thick is required. Cut the wood to size 4¾ins. long, and 5ins. wide, angle the corners off ½in. 45 degrees, as indicated. Cut two mortise slots 1in. by ¼in., in the positions indicated, to take the upright piece. Two recesses 1½ins. by 1½ins. are cut in the positions indicated, which are made ⅜in. deep to take the bowl of the pipes.

The upright for the stand is indicated in Fig. 4, and this is made in wood ¼in. thick. Cut the wood to size 10ins. long by 5ins. wide, and angle off the top corners ½in. 45 degrees, as shown. On the bottom edge carefully mark off the two tenons, as indicated, and cut them to a good fit in the mortise slots already made in the base. Mark off and carefully cut the three mortise slots ½in. by ¼in., as clearly indicated (see Fig. 4).

It now remains to make three spacers which support the figure to the upright, and at the same time provide two partitions to take the pipe stems. Details of the spacers are given in Fig. 5, and these are made in wood ¼in. thick.

First cut the three pieces of wood 2½ins. long by 2ins. wide, and carefully cut the tenons on the centre of each end, making them ½in. wide and a good fit in the mortise slots already cut in the figure indicated in Fig. 2, and the upright Fig. 4. Having made the items see they are smooth and nicely finished, and then fix together with glue.

First fix the upright into the base, then the three spacers into the upright, and finally the figure on to the front of the spacers.

The figure may be coloured with enamel paint, using black for the face, with red lips and black hands. The pinafore may be coloured in white enamel and spotted, as indicated, with black enamel. The rest of the stand may be nicely finished off with stain.

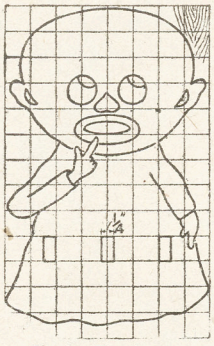


Fig. 2—The figure

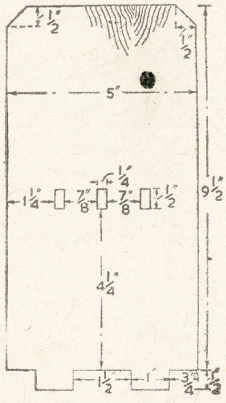


Fig. 3—Main back

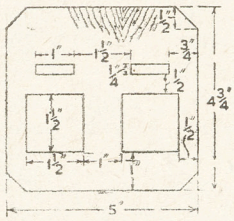


Fig. 4—The base

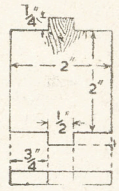
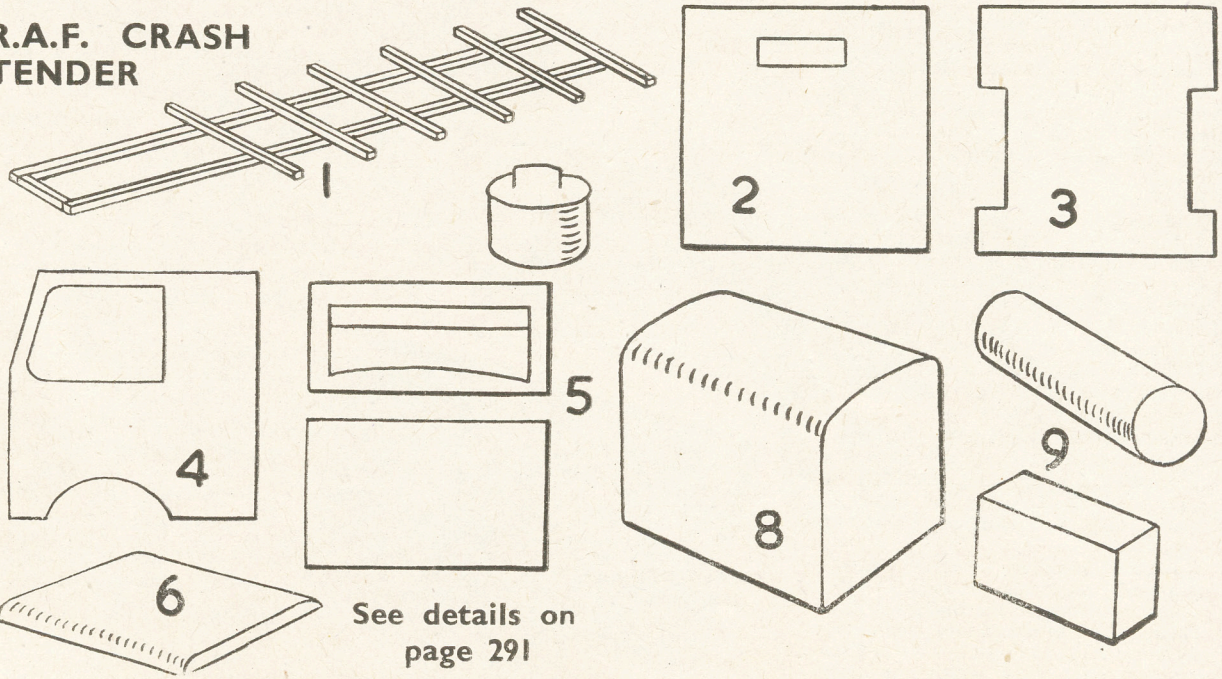


Fig. 5—Spacers

R.A.F. CRASH TENDER



See details on page 291

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Paste for Labels

FOR adhesive labels dissolve 1½oz. of common glue which has been immersed in cold water for a day, a little sugar and ¾oz. gum arabic, in 6oz. of hot water, stirring constantly till all are solved. This adhesive, applied to labels and allowed to dry, renders them suitable for use by moistening with the tongue.

Non-moulding Paste

A PASTE for general office use equal to any of the branded varieties may be made from equal parts of dextrine and starch paste to which has been added a little magnesium chloride and oil of cloves. It may be thinned with cold water.

Another Liquid Glue

A WELL-KNOWN recipe for liquid glue is scotch glue 12 parts, water 32 parts, spirits of salts 2 parts and zinc sulphate 3 parts. The mixture should be warmed for 12 hours and kept agitated. This glue does not gelatinize.

'Universal' Cement (Liquid)

UNDER this name are known many useful preparations that adhere strongly to almost any substance—wood, leather, metal, glass, etc. Here is a recipe for such a cement, and it is especially useful for repairing mineralogical specimens and similar articles. Grind down to a powder 2oz. of clear gum arabic, and dissolve it in a little water, then add 1½oz. best starch and ½oz. sugar to the solution, heating the mixture over a water-bath till the starch clears. The cement should be as thick as tar, and should remain so; and it can be kept from decomposing by the addition of a small lump of camphor or a few drops of oil of cloves or sassafras.

'Universal' Cement (Solid)

SHELLAC in pre-cast stick form is a good cement for most articles, and a mixture of 2 parts of it and 1 part of Venice turpentine also forms a strong adhesive.

Another so-called 'universal' cement is made by dissolving ½lb. sugar in 1½lb. water and adding to the thin syrup thus obtained 2oz. of slaked lime; and allowing the mixture to digest in a warm place for two days, after which the clear liquor is decanted from it. Now mix 6½oz. of this liquor with 6½oz. of water, and in it solve 1lb. of best gelatine; finally adding 1½oz. of strong (glacial) acetic acid and a few drops of carbolic acid as a preservative.

Celluloid Cement

FINE turnings or scraps of celluloid may be made into a perfect cement for celluloid by allowing them to digest in a closed bottle filled with either amyl acetate ('pear essence') or acetone (dimethyl-ketone). As the celluloid swells up during solution only enough solvent should be used to form a creamy transparent liquid. The surfaces of celluloid being united must be roughened by scraping or sandpapering. They should also both be treated with the cement and placed in immediate contact, not being disturbed till thoroughly set.

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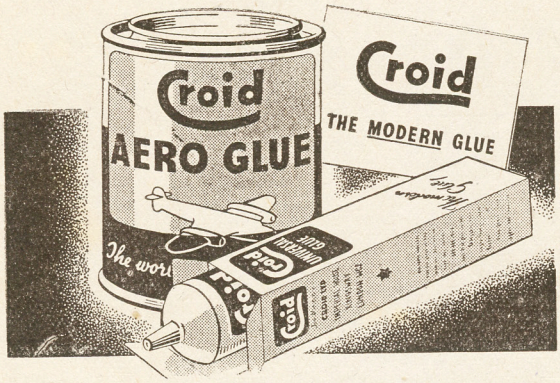

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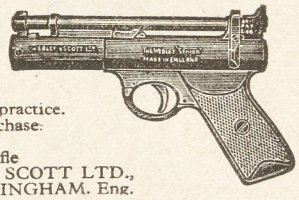

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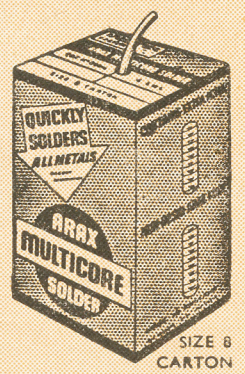

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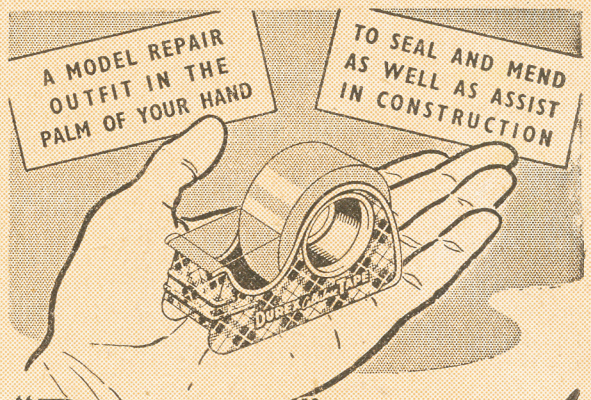

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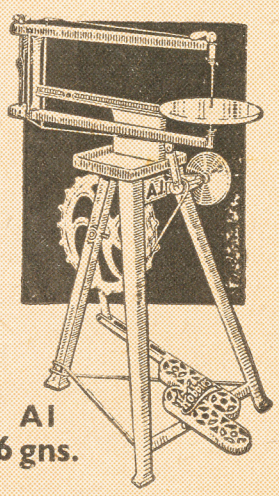

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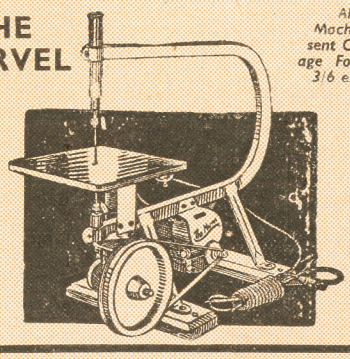

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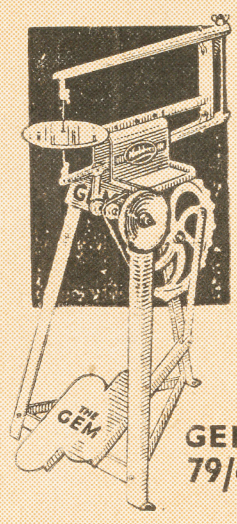

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The Marvel Bench Fretmachine. Welded steel frame, vertical stroke adjustable saw tension, working parts made from hardened steel. 17ins. clear behind sawblade. With 230/250 AC/DC motor **£10.** Without motor **70/-.** Details on request.

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